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THE CATSKILL MOUNTAINS.

BY

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The traveller who approaches the Catskill Mountains from the side of the Hudson River, which is the more general side of approach, sees outlined against the western horizon a series of elevations which are not particularly distinguished for loftiness or for dominating peaks or summits, or for that which makes ruggedness in scenery. They loom up to about the general height of the Highlands of Scotland, of the Harz Mountains of Germany, or of what was for a long time thought to be the culminating point of the State of Virginia, the Peaks of Otter. Although occupying one of the many regions of the United States which are fancifully designated "Switzerland of America," they have no features which are truthfully Alpine in character. There are no overshadowing peaks, no patches of snow to make glaciers, no bodies of water that have a mountain setting. The Catskills, barring some rugged precipices on their outer face, and a number of deeply-worn ravines or gorges, the so-called "cloves," present, in general, scenery of that subdued type which the geologist likes to associate—but not always accurately—with an ancient land-surface, in which the scenery has been shaping itself for almost untold ages. There are no great *aiguilles* or *Hörner*, none of those rugged serrations which the geologist, and again not always truthfully, prefers to recognize as types of a new country and of a newly-formed landscape. The Catskills, although less old than many of the mountainous parts of Norway, are yet much more subdued or gentle in outline than the Scandinavian Alps; although more ancient than the coal-bearing section of the Appalachian Mountains, they are more rugged in contour than these.

The geologist recognizes in them the remains of an ancient plateau, whose top-line is still well indicated in the nearly equivalent points of elevation to which the dominant summits rise, and out of this plateau have been carved out by water and atmospheric agencies those individualized elevations to which the names of "mountain," "mount," or "peak" have been given.

The association of elevations to which the name of Catskills (or, in the original Dutch, *Katzbergen*; the Indian *Onti Ora*, "Mountains of the Sky") has been given, lie in their main part in Greene and Ulster Counties, in the State of New York, with minor but not unimportant ramifications or projections, sometimes known under the names of Western Catskills and Delaware Mountains, extending westward into Delaware County. They cover an area of approximately five hundred square miles, or somewhat less than one and a half times that which is embraced within the municipal City of New York. On their eastern face they approach to within about eight miles of the Hudson River, when they descend abruptly, from a height of some 2,000-3,000 feet, into the basal plain below. Palenville, which is located at the east foot of the mountains, at the entrance to the Kaaterskill Clove, occupies a position 470 feet above the sea; back of it, in a straight distance of five and three-quarters miles, lies the village of Tannersville, at an elevation of nearly 1,900 feet above sea-level. At one point, where the crest of the plateau forms a ridge of South or Pine Orchard Mountain, marking the site of one of the oldest summer-frequented hostelries of the United States, the Catskill Mountain House, the plunge of the plateau forms a sheer cliff escarpment—a beetling crag, whose summit commands a view of surpassing grandeur, which by its atmosphere and distance can easily claim to be one of the most inspiring views of the national domain east of the Rocky Mountains. It was from the crest of this ledge, at an altitude of 2,225 feet, that Leatherstocking obtained what he laconically termed a "view of all creation."

The culminating point of the entire Catskill system is Slide Mountain, seven miles SW. of Phœnicia, and 30 miles SW. of the village of Catskill, which attains a height of 4,204 feet, or almost exactly 200 feet less than the highest point of all Britain, Ben Nevis. While thus more dignified than modest in elevation, the mountain still falls short of nearly all the better-known summits of the Adirondacks and lacks somewhat over 1,100 feet of the culminating point of the State (Mount Tahawas or Marcy). The second summit in elevation is seemingly Hunter Mountain, about three miles from Tannersville, which rises to 4,025 feet. Other noted points are Black Dome

(3,990 ft.) and Black Head (3,937 ft.), a few miles SW. of Cairo; High Peak (3,660 ft.) and Round Top (3,470 ft.), in the eastern section, almost directly W. of Palenville; Indian Head (3,585 ft.), and Overlook Mountain (3,150 ft.), near the southeastern angle; Peak-o'-Moose or Peekamoose (3,863 ft.), in the extreme south and three miles S. of Slide Mountain; Panther Mountain (3,760 ft.), four miles N. of Slide Mountain; and Big Indian (3,721 ft.), eight miles SW. of Shandaken and the adjacent Doubletop Mountain (3,905 ft.). The heights of other summits will be found on the map in this BULLETIN. Most of these mountains are, or were until recently, well wooded quite up to their summits, and the forest primeval was represented by magnificent specimens of the pine, spruce, liriodendron, oak, ash, hickory, beech, and maple. The rhododendron and mountain-laurel, with their superb blossoms of rose and white, still form here and there illumining patches of undergrowth, and recall in a minor way the glories of the chaparral bush of the Black Mountains of North Carolina.

The main region of the Catskill Mountains is drained primarily by Esopus and Kaaterskill Creeks and the Schoharie and Delaware Rivers, and their tributaries, the first two draining eastward directly into the Hudson, and the Schoharie northward into the Mohawk. The East Branch of the Delaware River rises in the western portion of the mountain knot, near the hamlet of Fleischmanns. There is reason to believe that at a not late period—the Post-Glacial of geologists—the Schoharie discharged directly eastward into the Hudson instead of, as it now does, into the Mohawk, a tilting of the land-surface northward being, as some geologists view the condition, responsible for this change of flow. What is assumed to be the ancient course of the river is marked out by a tortuous line of gravel and clays, which can be traced with sufficient continuity over a considerable extent of country. Other deserted river-beds are found in different parts of the region, and some of these also point to uplifting as a cause for the abandonment of a channel already formed. An element of charming quality in the landscape of the Catskill Mountains is furnished by the deeply-incised water-ways, gorges, or “cloves,” of the streams, mostly tributary to the main water-courses. Such are the cloves (South African Dutch *Kloof*) of the Kaaterskill, opening out into the basal plain at the eastern foot of the mountains at Palenville; the Plattekill, descending from near Tannersville to West Saugerties; the Stony Clove, connecting the plateau near Tannersville with the valley of the Esopus at Phoenicia; and the Deep Notch, between Lexington and Shandaken. The streams

flowing through these deep and rugged ravines are mostly mountain torrents of tempestuous courses, heavily laden with boulders, and some of them, like the Kaaterskill, heading up into true rock amphitheatres or *cirques*. The foaming streams that tumble from the crest of the plateau over the back walls of these amphitheatres are a striking and even imposing feature in the landscape of the Catskills, unfortunately too frequently marred by that narrowing of detail which results from a deficiency of water-supply. The most notable of the waterfalls of the region are those which occur in the main course of the Kaaterskill and the major leaps which terminate the forking cloves near its head—the Kaaterskill Falls, with a vertical descent in two sections (upper and lower) of 180 feet and 80 feet, and the Haines Falls, dropping about 155 feet and 80 feet. The Devasego Falls of the Schoharie are also strikingly picturesque. The cloves, with their rapidly pitching walls, are a recent product in the making of the Catskills, having been fashioned in greater part, if not entirely, since the close of the Great Ice Age or Glacial Period. This may have been many thousands of years ago, but the narrowness of the clefts and the steeply-pitched slopes bear testimony to comparative youth in existence—a life-period not sufficiently extended to have worn down the bounding walls into gently-flowing contours or to broaden out the narrow floors into openly-swelling valleys. Geologists speak of these ravines as V-shaped in cross-section, distinguishing them from the U-shaped form that marks the typical valley of old age or maturity.

A marked negative feature of the Catskill region is the absence of lakes, this structural feature, so largely developed in the Adirondacks, being virtually limited to the two tarns that lie near the eastern crest of the mountains as the head-waters of one of the arms of the Kaaterskill and bear the designations of North Lake and South Lake. They are mere shallow pans of water, lying a short distance from the foot of North Mountain, which in their expanse follow closely the vicissitudes of dry and wet weather.

The traveller who, hardly more than twenty-five or thirty years ago, visited the Catskill region need not have been surprised in his wanderings to come across the trail of some of the more formidable animals which in less accessible regions still constitute part of the fauna of the North Woods. The writer of this article has heard the cry of the American lion or panther (catamount) not far off the beaten path near the head of the Kaaterskill Clove, and he has come face to face with the bear on the open stage-road leading to the Mountain House. To-day these and other animals, such as the lynx

("wild cat"), badger, deer, and fox, have either been driven completely out of the country or pressed into the inner recesses before the steadily advancing tide of visitors and resident cottagers. But the region carries the impress of its fauna in the names that still cling to some of its more salient features, such as Panther Mountain, Panther Gorge, Bear Lodge, Mink Hollow, and Moose Mountain.

In their structural relations as part of the great Appalachian uplift—the expression of those series of disturbances in the earth's crust which resulted in the making of the parallel lines of mountains of the eastern United States which under different names (Alleghany Mountains, Blue Mountains, Kittatinny Mountains, Shawangunks, North Mountain, Shenandoah Mountains) make up the bulk of what is known as the Appalachian system—the Catskills recite a comparatively simple history. Long ages ago, at a time when hardly a reptile crawled upon the earth's surface, when the type of the common bony fish was entirely or all but undeveloped, when no bird winged its way through the atmosphere and thrilled the world with song, when long ages had still to come and to go before the earth was to know a quadruped, the sediments—muds, sands, pebbles—which were ultimately to make the Catskill rocks were accumulating; they were being laid down in an arm of a vast sea that extended westward through the interior of what is to-day the United States. These sediments were at a somewhat later time, when the mountain-making ("orogenic") movements were elevating the land out of the sea and by compression forcing up blocks of the crust into great swells or ridges, compacted into solid rock; and it is to this series of rocks, cropping out on the roadside, usually reddish, greenish or bluish in colour, forming the sandstone and shaly mass of the amphitheatres in the cloves, and giving much of the paving-slabs that in our eastern cities are known as "bluestones," that the name of Catskill Formation has been applied by geologists. It constitutes part of the upper (or newer) section of the great Devonian System, and corresponds, partially at least, in formation and time of formation with those Old Red Sandstones of the Scottish Highlands whose history has been so lovingly written by one of the earliest of systematic geologists, Hugh Miller. Here and there, if we examine the rocks closely, we may discover within it traces of the animal life which existed at the time that the rocks were being made. These traces may be in one place the shells of clams or sea-snails, at another place of different shrimp-like animals; or they may be the fragments of a giant representative (*Stylonurus*) of the modern king-crabs, or, again, the scales or parts of the dermal armour, or even the teeth

and jaws of a class of mailed or heavily-bucklered fishes (*Coccosteus*, *Bothriolepis*, *Holoptychius*) which are still generally known under the collective name of ganoids, and of which the sturgeon and the gar-pike have been thought to be lingering modern representatives. In some quarry, perhaps, where the quarrymen are lifting off slab from slab, we may note that the surfaces of the rock are crossed by wave-like ridges, half-an-inch or an inch across; these, the geologist tells us, are ancient "ripple"—ripple-marks, the same as are made to-day, impressed upon the ancient sands, and retained through millions of years. The rock-surfaces may also show "sun-cracks," and at rarer intervals we note those numerous scattered pits, "rain-drop impressions," which so eloquently read the lesson of ancient meteorology.

The rocks of the Catskill region did not partake of that general crumpling and folding which marked the elevation of the main ridges of the Appalachians. The region was lifted up without any great disturbing movements to impress themselves upon the newly forming land-surface; and hence it is that in nearly all parts where the rock-beds are exposed to view they appear to lie in nearly horizontal lines ("horizontal bedding") or in lines that fall ("dip") gently toward the interior. It is bound in with this condition, likewise, that the region, like its correspondents, the Pocono, Alleghany, and Cumberland plateaus farther south, retains a plateau character instead of one of rapidly alternating ridges and included longitudinal valleys, or of an aggregation of irregularly-sorted mountain buttresses. Overlying the shales, flags, and sandstones which build up the great bulk of the mountains, and appearing here and there as a capping to their higher points, is a series of rough pebbly rocks which belong to a system seemingly somewhat newer in date than the Devonian—namely, the Sub-Carboniferous. They are known to the systematists as the Pocono Sandstone or Conglomerate, and are the local "pudding-stones" of the everyday field observer. We recognize in them merely an ancient shingle, or "shingle-beach," in which the individual pebbles have been firmly united or cemented together. It is this rock which bounds some of the narrow passages that in the region have been facetiously termed "lemon squeezers."

The casual visitor to the Catskills, be he geologist or not, can hardly fail to notice that in some places the exposed rock-masses have been worn down to singularly smooth surfaces, and that in these or other parts their surfaces are grooved with parallel lines or furrows, most of them perhaps not thicker or wider than a slate-pencil, but others swelling out into broad flutings. One finds the

same kind of smoothened or polished surfaces, of impressed lines ("striæ") and grooves, in almost every country that is to-day traversed by glaciers; and it is, perhaps, not remarkable that the far sight of Louis Agassiz, an ardent student of the Alps, should have so easily detected in them the features of ice-worn Switzerland. It is to him, primarily, that the geologist owes the recognition of an Ice Age or Glacial Period, in the Western Hemisphere, when great tongues of ice—giant glaciers—moved over a large part of the northern United States east of the Mississippi Valley, and in a minor way westward of it, burying the landscape beneath a mantle of a long-protracted winter, and heaping up the ice, o'er mountain and valley, to thicknesses of hundreds and thousands of feet. At whatever time-period these Arctic conditions may have prevailed over what is to-day temperate America—whether, as some geologists would lead us to believe, it was only 10,000-20,000 years ago, or, again, as others think, 35,000-50,000 years, or more—it is certain that at that time the Catskills were buried to their brim with ice, and that there were few if any spots to protrude through the great capping of glaciers that rode over their summits. The general direction of movement of the glaciers was southward or southwestward, as the "spring" points in the striæ plainly indicate, and as the numerous travelled blocks of stone, the glacial boulders or "erratics," with characters impressed upon them to show that their mother rock lay in a more or less distant land northward, just as clearly prove. These erratics are scattered about on mountain-top and in the valley, strangers among the rock-masses in whose keeping they are now placed. Many of them are fossiliferous, and contain an aggregation of fossils that are not to be found in the rock *in place* of the region.

No description of the Catskill region would be complete without a passing reference to some of the points of view which have become noted for the magnificence of the panoramas which they command, such as the Pine Orchard ledge of which mention has already been made, whence the eye sweeps over into the mountain country of Massachusetts, Vermont, and New Hampshire; the Kaaterskill Knob (2,500 ft.), North Mountain (3,440 ft.), North Mountain Outlook (3,100 ft.), Sunset Rock (2,115 ft.), Prospect Rock, Palenville Overlook (1,660 ft.), Overlook Mountain, Slide Mountain, and Pine Hill Summit (2,500 ft.), the last-named on the watershed between the Hudson and Delaware rivers. The association of the mountains with American legendary lore is revealed in the personality of Rip Van Winkle, the scene of whose chief adventure is laid in Sleepy Hollow, on the lower eastern slope of North Mountain.

THE MAP OF THE CATSKILLS.

The readers of the *BULLETIN* will find in this issue a map of the Catskill Mountains and the adjacent parts of the Hudson River valley. The map is an excellent specimen of cartographic art, which would not have been possible to make if the topographic sheets of the United States Geological Survey, covering the entire region of the Catskills, had not been completed. The map is grounded upon these sheets, and it has, therefore, a scientific basis.

This fact, however, would not be sufficient to make the map a scientific product. That end could be gained only by having the map produced by cartographers of the highest attainment, able to interpret the information on the base sheets and reproduce it on the smaller map without the sacrifice of essential facts. These results have been secured in this accurate and artistic map of the Catskills.

Maps giving an equally correct idea of parts of the earth can be made at this time of only a comparatively small area, because detailed surveys, as yet, cover only a small part of the world. Such superior maps may be made of nearly the whole of Europe, of about a third of our own country, and a few other important areas. All good maps may give an excellent idea of the shape, size, and position of the land masses, because the maritime nations send their warships and other vessels to make scientific surveys of nearly every coast and to keep their charts up to date.

The second basis of the best atlas maps is the topographical surveys which are constantly being extended. But maps of the larger part of the land surfaces still depend upon vast accumulations of data relating to the position and elevation of places and areas, the direction and length of highways and routes, etc., and the critical expertness of the geographer in selecting from the mass of material that which is most worthy to be reproduced.

The American Geographical Society had an educational purpose in view in producing the Catskill map. It desired to show what truthful and admirable maps may be made of our own country, so far as the Government topographic surveys supply the material. These surveys have been completed in several of our States, and are far advanced in many parts of the country, so that we may hope the day is not far distant when first-rate maps of large parts of the United States will be found in our atlases. Our deficiency in good atlas maps of our own domain is often commented upon at home

and abroad. Attention was called, for example, in the "Literaturbericht" of *Petermanns Mitteilungen*, for January, to the great progress our topographic surveys have made, and the writer said it could scarcely be believed that the importance of making a good map of the United States, based upon these surveys, would not soon appeal to so practical and highly developed a people as the American.

This map is an example of first-rate cartographic work. It gives intelligent expression to the geographical truth about the Catskill plateau and the neighbouring plain. These facts might be given in more detail on a larger scale, but the purpose was to produce an accurate map sheet adapted for an ordinary folio atlas, convenient to handle and suited for carrying in the pocket.

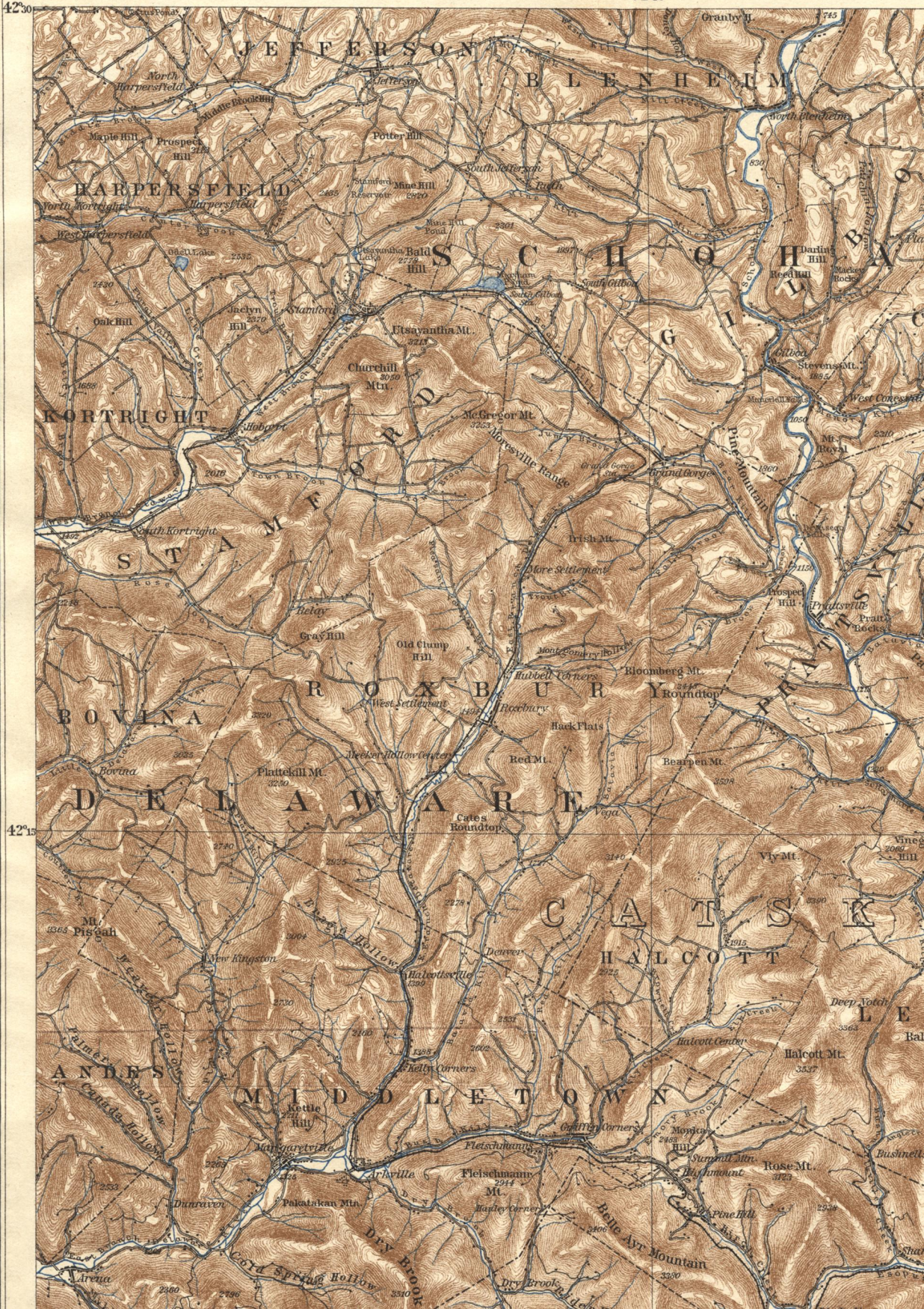
The reader familiar with any part of the Catskills will find much to interest him in this map. He will see the brooks as well as the rivers; the common roads and the trails, as well as the railroads. If the house in which he spent his vacation weeks is outside of the crowded village, he will probably see it indicated. If he has ever followed a short private road leading to an isolated house, he will see both the road and the dot where the house stands. He will observe the level stretch of the valleys, the forms of the mountain ranges, and the heights of the conspicuous summits; and this small sheet will convince him that a high-class map is a short cut to a great variety of information—a book of description and explanation condensed by cartographic methods to a small compass.

To produce the map the Society engaged the services of Wagner & Debes of Leipzig, one of the leading cartographic houses of the world. The thanks of the Society are extended to this firm for the great care and efficiency with which they carried out the commission. The work was not done at home, simply for the reason that so adequate a result in the way of generalization of the superior cartographic material supplied by the Government topographic survey cannot at present be procured in our country. We may hope that the lack of so important a facility will be remedied in the near future.

Copies of the map, folded for the pocket, may be obtained at the Office of the American Geographical Society for twenty-five cents a copy.

74°45'
42°30'

74°30'

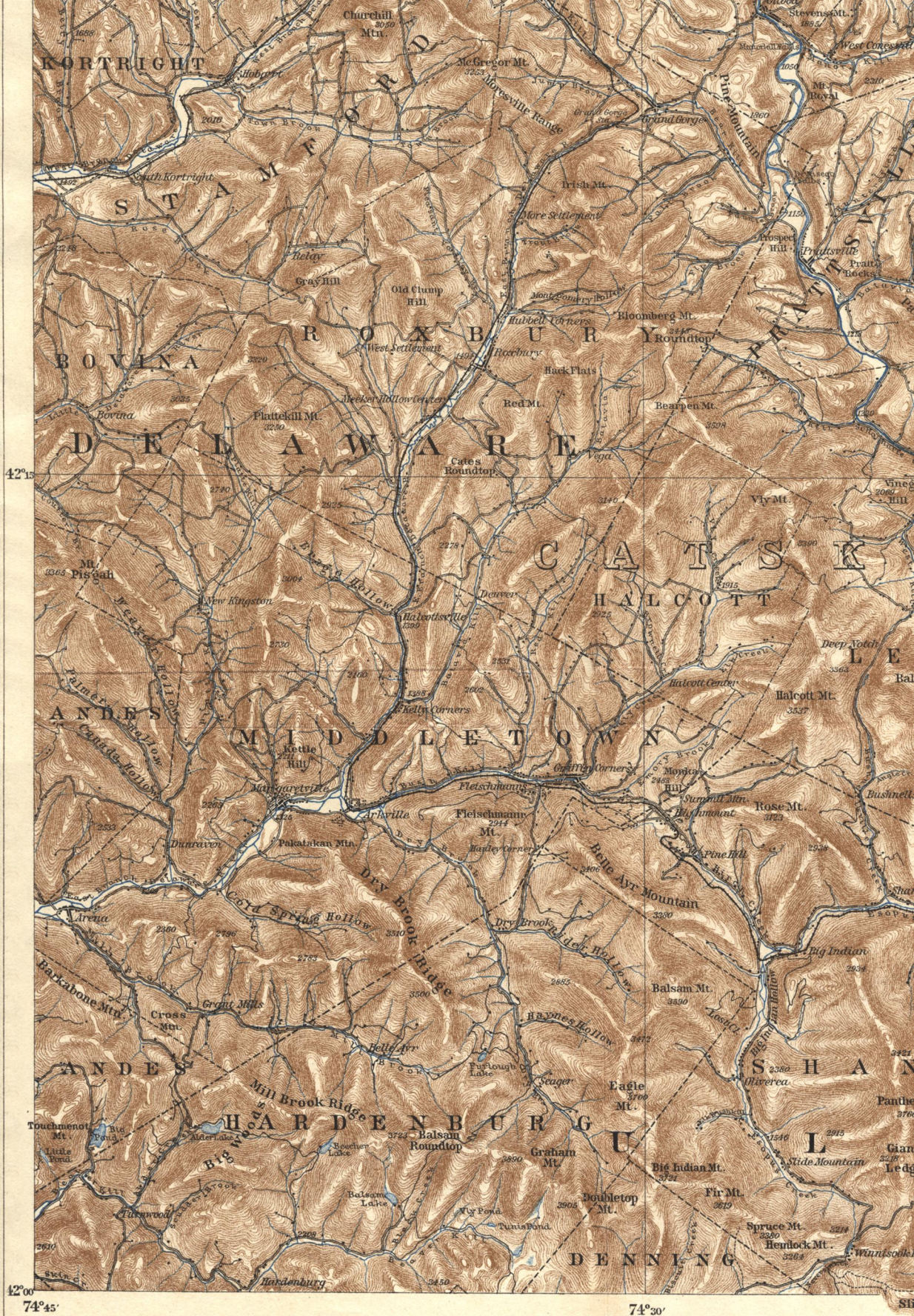




74°00'

73°45'
42°30'





Based on the Topographic Sheets of the U.S. Geological Survey



74°00'

42°00'
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